

**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

1. (Currently Amended) A method of internally encrypting data in a relational database, comprising the steps of:

providing a database engine having encryption as a database kernel feature;  
providing a security dictionary comprising one or more security catalogs;  
receiving data from a user;  
associating said data with a database column and at least one authorized user;  
generating a working encryption key;  
internally encrypting said working encryption key within [[a]] said database engine using a public key from an authorized user;  
storing said encrypted working key in a security catalog; and  
internally encrypting said data within said database engine using said working key.

2. (Original) The method of claim 1 further comprising the step of generating a private key needed to decrypt said encrypted working key.

3. (Original) The method of claim 2 wherein said public key is a password and is used by the system to look up said private key.

4. (Original) The method of claim 1 wherein said step of associating said data with a database column and a user is accomplished with an extended SQL syntax and further comprises the step of creating a relational database object comprising:

the identity of said authorized users;  
a relational database table;  
the identity of said column within said relational database table; and  
one or more security flags, said flags indicating user privileges to access said data.

5. (Original) The method of claim 1 wherein said working key is provided by a user.

6. (Original) The method of claim 1 wherein said working key is randomly generated.

7. (Original) The method of claim 1 further comprising the steps of:  
receiving a query and private key from a user;  
checking the ownership of an encrypted column using said security catalog to verify the user is authorized;  
internally decrypting said encrypted working encryption key with said private key;  
internally decrypting said encrypted column with said working key;  
processing said query; and  
returning an answer to said query to the user.

8. (Currently Amended) A program storage device readable by machine, tangibly embodying a program of instructions executable by the machine to perform method steps for internally encrypting data in a relational database, said method steps comprising:

- providing a database engine having encryption as a database kernel feature;
- providing a security dictionary comprising one or more security catalogs;
- receiving data from a user;
- associating said data with a database column and at least one authorized user;
- generating a working encryption key;
- internally encrypting said working encryption key within [[a]] said database engine using a public key from an authorized user;
- storing said encrypted working key in a security catalog; and
- internally encrypting said data within said database engine using said working key.

9. (Currently Amended) The ~~invention~~ program storage device of claim 8 further comprising the step of generating a private key needed to decrypt said encrypted working key.

10. (Currently Amended) The ~~invention~~ program storage device of claim 9 wherein said public key is a password and is used by the system to look up said private key.

11. (Currently Amended) The ~~invention~~ program storage device of claim 8 wherein said step of associating said data with a database column and a user is accomplished with an extended SQL syntax and further comprises the step of creating a relational database object comprising:

the identity of said authorized users; a relational database table;  
the identity of said column within said relational database table; and  
one or more security flags, said flags indicating user privileges to access said data.

12. (Currently Amended) The ~~invention~~ program storage device of claim 8 wherein said working key is provided by a user.

13. (Currently Amended) The ~~invention~~ program storage device of claim 8 wherein said working key is randomly generated.

14. (Currently Amended) The ~~invention~~ program storage device of claim 8 further comprising the steps of: receiving a query and private key from a user;  
checking the ownership of an encrypted column using said security catalog to verify the user is authorized;  
internally decrypting said encrypted working encryption key with said private key;  
internally decrypting said encrypted column with said working key;  
processing said query; and  
returning an answer to said query to the user.

15. (Previously Presented) The method of claim 1 further comprising the step of writing the encrypted data into a database disk page, after the step of internally encrypting said data within said database engine using said working key.

16. (Previously Presented) The method of claim 8 further comprising the step of writing the encrypted data into a database disk page, after the step of internally encrypting said data within said database engine using said working key.

17. (Currently Amended) A method of internally creating an index for encrypted data, comprising the steps of:

- fetching encrypted data pages from storage;
- computing a data encryption/decryption key;
- decrypting the data to form plaintext data pages;
- using said plaintext data pages, building an index and forming index pages; and
- encrypting said index pages.

18. (New) A method of extending the core SQL statements to integrate encryption as a core feature into a relational database system, comprising the steps of:

- adding ENCRYPTION clause to a CREATE TABLE statement;
- adding USER clause to the CREATE TABLE statement;
- adding ENCRYPTION clause to an ALTER TABLE statement;
- adding KEY clause to an INSERT statement;
- adding KEY clause to a SELECT statement;

adding UPDATE clause to a CREATE USER statement; and  
modifying core SQL statements to integrate encryption and key management as  
a core database feature supported internally by query compilation and execution  
components of a database system.